

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE
STATE OF HAWAII

In the Matter of

PUBLIC UTILITIES COMMISSION

Instituting a Proceeding to Investigate the
Implementation Of Feed-in Tariffs.

DOCKET NO. 2008-0273

PUBLIC UTILITIES
COMMISSION

2010 MAR -1 P 3:25

FILED

**BLUE PLANET FOUNDATION'S RESPONSES TO THE HAWAIIAN
ELECTRIC COMPANY, INC., HAWAII ELECTRIC LIGHT COMPANY,
INC., AND MAUI ELECTRIC COMPANY, LIMITED'S INFORMATION
REQUESTS FILED FEBRUARY 16, 2010, AND TO THE DEPARTMENT
OF COMMERCE AND CONSUMER AFFAIRS, DIVISION OF
CONSUMER ADVOCACY'S INFORMATION REQUESTS FILED
FEBRUARY 16, 2010**

AND

CERTIFICATE OF SERVICE

SCHLACK ITO LOCKWOOD PIPER & ELKIND
Douglas A. Codiga, Esq.
Topa Financial Center
745 Fort Street, Suite 1500
Honolulu, Hawaii 96813
Tel. (808) 523-6040

Attorney for Blue Planet Foundation

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE
STATE OF HAWAII

In the Matter of

DOCKET NO. 2008-0273

PUBLIC UTILITIES COMMISSION

Instituting a Proceeding to Investigate the
Implementation Of Feed-in Tariffs.

**BLUE PLANET FOUNDATION'S RESPONSE TO THE HAWAIIAN
ELECTRIC COMPANY, INC., HAWAII ELECTRIC LIGHT COMPANY,
INC., AND MAUI ELECTRIC COMPANY, LIMITED'S INFORMATION
REQUESTS FILED FEBRUARY 16, 2010, AND TO THE DEPARTMENT
OF COMMERCE AND CONSUMER AFFAIRS, DIVISION OF
CONSUMER ADVOCACY'S INFORMATION REQUESTS FILED
FEBRUARY 16, 2010**

Blue Planet Foundation ("Blue Planet"), by and through its attorneys Schlack Ito Lockwood Piper & Elkind, hereby responds to (i) the Hawaiian Electric Company, Inc. ("HECO"), Hawaii Electric Light Company, Inc. ("HELCO"), and Maui Electric Company, Limited's ("MECO") (collectively, "HECO Companies") Information Requests filed February 16, 2010, and (ii) the State of Hawaii Department of Commerce and Consumer Affairs, Division of Consumer Advocacy's ("Consumer Advocate") Information Requests filed February 16, 2010, as follows.

General Objection

As a preliminary matter, Blue Planet interposes a general objection to the HECO Companies' and Consumer Advocate's Information Requests to the extent they are overbroad, vague, ambiguous, duplicative, and/or unduly burdensome. Without waiving this objection, the following responses are made in a good faith effort to supply as much information as is presently

known, but are not intended to prejudice Blue Planet in relation to further discovery, disclosure, research or analysis.

Definitions

Blue Planet defines the following terms, used herein, as follows:

“DG” means distributed generation from intermittent renewable energy sources.

“DG cap” means a potential future limit, as distinguished from the D&O FIT cap, on the amount of DG that can be added, under any procurement mechanism, to a HECO Companies’ electric system, based solely upon the system’s technical limitations.

“D&O FIT cap” means, for the Feed-in Tariff (“FIT”) program, nameplate capacity equal to 5.0% of the 2008 system peak demand for each of the HECO Companies, as set forth in the September 25, 2009 Decision and Order in this matter (“D&O”).

“FIT cap” means a potential future limit, as distinguished from the D&O FIT cap, on the amount of DG that can be added, under the FIT program, to a HECO Companies’ electric system, based solely upon the system’s technical limitations.

“Hawaii NERC RS” means formal bulk electric system reliability standards governing the HECO Companies’ electric systems that are (i) equivalent to NERC RS, (ii) developed in the future pursuant to the Hawaii NERC RS development process, and (iii) upon completion, administered by an independent entity, such as a Hawaii Independent System Operator (“HISO”).

“Hawaii NERC RS development process” means a future stakeholder-driven process, overseen by an independent entity, to develop the Hawaii NERC RS.

“HECO DG cap” means a potential future limit, as distinguished from the D&O FIT cap, on the amount of DG that can be added, under all DG procurement mechanisms, to the

HECO Companies' electric systems, based upon the HECO informal operating practices and procedures.

"HECO FIT cap" means a potential future limit, as distinguished from the D&O FIT cap, on the amount of DG that can be added, under the FIT program, to the HECO Companies' electric systems, based upon the HECO informal operating practices and procedures.

"HECO informal operating practices and procedures" means the practices and procedures utilized by the HECO Companies in place of Hawaii NERC RS and offered by the HECO Companies in support of the proposed HECO FIT cap and HECO DG cap.

"NERC RS" means the formal bulk electric system reliability standards administered by the North American Electric Reliability Corporation ("NERC").

RESPONSE TO HECO COMPANIES' INFORMATION REQUESTS

HECO/BluePlanet-IR-1

Ref: Page 1, second paragraph.

Please explain in detail how Blue Planet's proposed Reliability Principles set forth at page 8 will directly result in a dramatic acceleration of "renewable energy acquisition in Hawaii"?

RESPONSE:

The HECO Companies' electric systems should be planned and operated according to Hawaii NERC RS as soon as possible. There are no technical reasons barring the use of Hawaii NERC RS for the HECO Companies' systems. First, virtually all electric systems in the continental United States operate under NERC RS. Second, the HECO Companies' systems are basically the same as other United States systems operating under NERC RS insofar as all systems must maintain adequate voltage, balance supply and demand in real time, and maintain system stability. Third, the Electric Reliability Council of Texas ("ERCOT")

Interconnection has no alternating current (“AC”) interconnection with either the NERC Eastern Interconnection or Western Interconnection and must therefore rely solely on internal resources to balance supply and demand in real time. In that respect, it is a type of “island” system similar to the HECO Companies’ systems. Yet the ERCOT Interconnection (as required by law¹) is nonetheless planned and operated according to NERC RS as implemented by the independent ERCOT.

The HECO Companies’ electric systems are not currently planned and operated according to Hawaii NERC RS. First, the HECO informal operating practices and procedures lack the same level of formality and specificity as NERC RS. For example, NERC RS establish specific requirements concerning frequency and voltage. The HECO Companies have testified they do not utilize a formal reliability standard for frequency and voltage. *See, e.g.*, Transcript of April 13-17, 2009 Panel Hearing (Docket No. 2008-0273), Vol. I at 206, Lines 19-21 (“And we don’t – at this time we don’t have those types of reliability standards or metrics.”); Vol. I at 197, lines 19-23 (“At this time for the – the HECO companies there is no standard, per se, like a plus or minus frequency deviation, or three outages per year due to variable generation. There is no – none of those types of quantifiable criteria.”); *see also* Vol. I at 182, lines 7-20; Vol. I at 189, lines 19-22. As the name implies, future Hawaii NERC RS are expected to establish a specific requirement for frequency and voltage.

As another example, the HECO Companies have suggested that the Commission’s General Order No. 7, “Standards for Electric Utility Service in the State of Hawaii” (“General Order 7”), constitutes “reliability standards.” *See, e.g.*, Reply Brief of the HECO Companies and Consumer Advocate filed June 26, 2009 at 17-18. Hawaii NERC RS,

¹ *See* 16 U.S.C. § 824o(c)(1) (concerning development and enforcement of “reliability standards that provide for an adequate level of reliability of the bulk-power system[.]”); 16 U.S.C. § 824o(k) (provisions of 16 U.S.C. § 824o do not apply to Alaska or Hawaii).

however, are expected to be substantially more detailed and complex compared to General Order 7, which sets forth only rudimentary requirements and which the Commission adopted in 1968 – over four decades ago – well before the current major transition to a clean energy economy.

Second, due to the absence of formal reliability standards, such as Hawaii NERC RS, the HECO Companies are at present under no requirement to publish official reports concerning compliance with Hawaii NERC RS. Reporting on compliance with formal reliability standards, such as Hawaii NERC RS, will allow verification and increased knowledge and understanding about reliability issues by the Commission and stakeholders. Finally, the HECO informal operating practices and procedures are not equivalent to NERC RS because they have not been developed pursuant to a stakeholder-driven process overseen by an independent entity. By contrast, NERC RS undergo this type of stakeholder-driven development process as will future Hawaii NERC RS.

This proceeding entails three related issues concerning DG caps and FIT caps for the HECO Companies' systems ("caps issues"). The three caps issues are (i) whether any DG caps are required, in addition to the D&O FIT cap,² (ii) whether any FIT caps are required, in addition to the D&O FIT cap, and (iii) assuming such caps are required, whether the HECO DG caps and/or the HECO FIT caps are required.

At this time, the Commission has established the FIT D&O cap, based primarily on ratepayer impact. *See* D&O at 52-55. The Commission has also concluded that "reliability

² *See* (i) HECO Companies' Report on Reliability Standards filed Feb. 8, 2010, including Exhibit 1, "Proposed FIT Reliability Standards for the Hawaiian Electric Companies" and attachments, (ii) HECO Companies' Clarification to Reliability Standards Report filed Feb. 9, 2010, and (iii) HECO Companies' Response to Commission Letter of Feb. 19, 2010 (collectively, "HECO RS Report"). The HECO RS Report proposes a Working Group, a primary objective of which is to review and "validate" the findings of the HECO RS Report. *See* HECO Companies' Response to Commission Letter of February 19, 2010, Attachment 1 at 2 ("To the extent that the existence of reliability and/or curtailment challenges of integrating more variable renewables – including FIT resources – are validated . . ."). Thus, although the D&O has concluded that "reliability constraints exist," Blue Planet respectfully submits that, based in part on the HECO Companies' statements, the issue of whether any DG caps are required, in addition to the D&O FIT cap, arguably remains unresolved to a certain extent at this time.

constraints exist” and directed the development of “reliability standards.” D&O at 49. (Blue Planet’s understanding is that the Commission-directed “reliability standards” function essentially as DG and FIT caps, and may therefore properly be referred to as “caps” rather than “reliability standards” to avoid confusion with NERC RS, Hawaii NERC RS, or other similar formal reliability standards.) The HECO RS Report proposes the HECO DG cap and HECO FIT cap,³ based upon the HECO informal operating practices and procedures.

The three caps issues (i.e., necessity for DG caps, necessity for FIT caps, and necessity of proposed HECO DG and FIT caps) should be evaluated only on the application of Commission-approved Hawaii NERC RS to the relevant facts. The HECO informal operating practices and procedures do not provide an adequate basis for this evaluation. As discussed above, Hawaii NERC RS are superior to HECO informal operating practices and procedures. Caps based on Hawaii NERC RS will provide a sound, trustworthy and proper basis a Hawaii FIT cap and therefore contribute to greater transparency and predictability.

Pending development and Commission approval of Hawaii NERC RS, Blue Planet has proposed the Hawaii Bulk Electric System Reliability Principles. As more fully explained in Blue Planet’s Reliability Standards filing, in its January 18, 2007 Order on Compliance Filing, FERC directed NERC to file a plan for defining the term “adequate level of reliability.” *See* Order on Compliance Filing, 118 FERC ¶ 61,030 at para. 16. Accordingly, NERC has identified six characteristics describing when a bulk power system will achieve an “adequate level of reliability.” *Id.* Blue Planet proposes these six characteristics as Hawaii Bulk Electric System Reliability Principles.

³ The HECO RS Report’s proposed “reliability standards” essentially function as DG and/or FIT caps and therefore may accurately be referred to as caps.

Proposed Hawaii Bulk Electric System Reliability Principles

1. The system is controlled to stay within acceptable limits during normal operations.
2. The system performs acceptably after credible contingencies.
3. The system limits the impact and scope of instability and cascading outages when they occur.
4. The system's facilities are protected from unacceptable damage by operating them within facility ratings.
5. The system's integrity can be restored promptly if it is lost.
6. The system has the ability to supply the aggregate electric power and energy requirements of the electricity consumers at all times, taking into account scheduled and reasonably expected unscheduled outages of system components.

See Letter from D. Cook (NERC) to Hon. K. Bose (FERC) at Attachment B, p. 6, attached as Exhibit A to Blue Planet's Reliability Standards.

Thus, until Hawaii NERC RS are adopted, Blue Planet's proposed Hawaii Bulk Electric System Reliability Principles can be expected to promote the dramatic acceleration of renewable energy in Hawaii in several important ways. First, because these principles are based on formal principles from NERC, they are expected to be consistent with and supportive of Hawaii NERC RS. Second, they may serve as a timely and appropriate intermediate step toward the adoption of Hawaii NERC RS. Third, the principles can be expected to clarify and strengthen shared understanding of the basic requirements of the electric systems, thereby further establishing the foundation for Hawaii NERC RS. Finally, these principles can serve as a basis for modification of policies regarding ancillary services and other measures to reduce or eliminate barriers to increased renewable energy on the systems. The Hawaii Bulk Electric

System Reliability Principles therefore represent a meaningful step toward Hawaii NERC RS and moving beyond the HECO informal operating practices and procedures.

HECO/Blue Planet-IR-2

Ref: Page 2, first incomplete paragraph.

Please explain in detail the modifications to the NERC bulk electric system reliability standards that “may be necessary and appropriate for Hawaii island grids”? Please provide copies of any analyses or studies which Blue Planet has conducted or commissioned to indicate what these proposed modifications are?

RESPONSE:

The HECO Companies’ electric systems should be planned and operated according to Hawaii NERC RS as soon as possible. Such standards should be developed according to the Hawaii NERC RS development process. That process is driven by stakeholder and overseen by an independent entity. The Hawaii NERC RS process has not been undertaken or completed. Until this process is substantially completed, it is not possible to identify in detail modifications to NERC RS that may be necessary and appropriate for the HECO Companies’ systems.

Broadly speaking, Blue Planet anticipates NERC RS that are directly and solely predicated on interconnected electric systems, or wholesale power transactions between electric utilities, would require modification insofar as Hawaii electric systems lacks these basic features. An independent entity, such as a HISO, would implement the Hawaii NERC RS. Like NERC Regional Reliability Organizations, the HISO or other independent entity would implement the Hawaii NERC RS in a manner that reflects local system characteristics and grid configurations, similar to the manner in which ERCOT operates in Texas. NERC Area Control Error (“ACE”) frequency control standards, which govern utility management of frequency fluctuations, are not

utilized by ERCOT and it is anticipated that ACE would also not be employed for the HECO Companies' systems for the same or similar reasons.

HECO/BluePlanet-IR-3

Ref: Page 2, first incomplete paragraph.

Is it Blue Planet's position that the Hawaiian Electric Company grids are not presently operated pursuant to reliability standards and principles appropriate for the Hawaii island grids? If yes, please provide a detailed explanation as to how Blue Planet reached his conclusion?

RESPONSE:

The HECO Companies' electric systems are operated according to the HECO informal practices and procedures. Blue Planet submits that these are not "appropriate" for the HECO Companies' systems insofar as Hawaii NERC RS are expected to provide a superior basis for addressing and resolving the three caps issues, for the reasons set forth in Blue Planet's response to HECO/Blue Planet-IR-1, above.

HECO/Blue Planet-IR-4

Ref: Page 2

Please clarify the statement, "interconnection and curtailment of renewable energy Hawaii should be governed by formal bulk electric system reliability standards based upon existing North America Electric Reliability Corporation bulk electric system reliability standards, modified as may be necessary and appropriate for Hawaii island grids."

a) Is it Blue Planet's understanding that "bulk", as used in the above sentence, refers to transmission systems of facilities at 100 kV and higher? If so, please elaborate.

RESPONSE:

The term "bulk," as used in the referenced sentence, refers to transmission systems of facilities operating both above and below 100 kilovolts ("kV"). In general, "bulk power" refers generation and transmission systems collectively. Although bulk power transmission typically refers to transmission line voltages of 100 kV, higher voltage lines (e.g., a radial line with a one-way power flow) may be excluded from the definition of bulk power

transmission. Similarly, lower voltage (e.g., 46 and 69kv) transmission lines (e.g., a tie line with a two-way power flow that is an integral part of an integrated transmission network) may be included in the definition in bulk power transmission. This is consistent with the NERC

Glossary of Terms, which defines “Bulk Electric System” as follows:

As defined by the Regional Reliability Organization, the electrical generation resources, transmission lines, interconnections with neighboring systems, and associated equipment, generally operated at voltages of 100 kV or higher. Radial transmission facilities serving only load with one transmission source are generally not included in this definition.

*Id.*⁴ (emphasis added). Thus, consistent with this definition an independent entity in Hawaii equivalent to a NERC Regional Reliability Organization may define “bulk” to refer to transmission systems of facilities operating both above and below 100 kV.

b) Is it Blue Planet’s intent that all renewable resources be connected at the transmission level (i.e., the bulk electric system) and not the distribution level? If so, please elaborate.

RESPONSE:

Renewable energy resources should be interconnected at the transmission level or at the distribution level, as determined by reference to future Hawaii NERC-equivalent formal system reliability standards, applicable interconnection requirements, sound engineering principles and good utility practice.

HECO/BluePlanet-IR-5

Ref: Page 3, first complete paragraph.

a) Please describe in detail the “operational challenges in Hawaii” that may “require modification of NERC RS”? Please provide any analyses or studies of these “operational challenges” which Blue Planet has conducted or commissioned.

RESPONSE:

⁴ Available at http://www.nerc.com/files/Glossary_12Feb08.pdf

The Hawaii NERC RS development process has not been undertaken or completed. Until this process is substantially completed, it is not possible to identify in detail operational challenges that may require modifications to NERC RS for Hawaii. Island systems are not interconnected and thus unable to use other generation sources for operating reserves or back-up power when a major generating unit is off-line due to planned or unplanned maintenance. Blue Planet anticipates NERC RS may require modification to address such operational challenges. NERC Area Control Error (“ACE”) frequency control standards, which govern utility management of frequency fluctuations, are not utilized by ERCOT and it is anticipated that ACE would also not be employed for the HECO Companies’ systems for the same or similar reasons.

b) Please describe in detail any differences in the “basic physical and operational characteristics” of each Hawaiian Electric island grid and the electric grid of “North America”?

RESPONSE:

The HECO Companies’ systems are basically the same as other United States systems operating under NERC RS insofar as all systems must maintain adequate voltage, balance supply and demand in real time, and maintain system stability. The ERCOT Interconnection has no AC interconnection with either the NERC Eastern Interconnection or Western Interconnection and must therefore rely solely on internal resources to balance supply and demand in real time. In that respect, it is a type of “island” system similar to the HECO Companies’ systems. Yet the ERCOT Interconnection (as required by law⁵) is nonetheless planned and operated according to NERC RS as implemented by the independent ERCOT.

⁵ See 16 U.S.C. § 824o(c)(1) (concerning development and enforcement of “reliability standards that provide for an adequate level of reliability of the bulk-power system[.]”); 16 U.S.C. § 824o(k) (provisions of 16 U.S.C. § 824o do not apply to Alaska or Hawaii).

c) Please describe in detail Blue Planet's understanding of the processes and procedures used by the Hawaiian Electric Utilities to "maintain adequate voltage, balance supply and demand in real time, and maintain system reliability"?

RESPONSE:

Blue Planet's understanding is that the HECO Companies appear to use EMS and SCADA systems to control and monitor the grid, economic dispatch and AGC to control generators, AVR to control reactive supply and (with LTC transformers, voltage regulators and capacitors) system voltages, generating governor control (droop response) and operating reserves to regulate frequency and respond to system disturbances, and UFLS used to arrest precipitous frequency declines. These features are basic features or "tools" common to many electric utilities, however, and do not alter the conclusion that the HECO Companies' electric systems are not currently planned and operated according to Hawaii NERC RS for the reasons set forth in Blue Planet's response to HECO/Blue Planet-IR-1, above.

d) Please describe in detail how the processes and procedures identified in your response to IR-10, part c, differ from those utilized for the North American grid.

RESPONSE:

Assuming IR-5, part c is referred to,⁶ certain types of equipment used in operating systems in Hawaii and North America appear to be essentially the same. The "processes and procedures" differ insofar as North American systems are governed by NERC RS and Hawaii systems are operated according to the HECO informal operating practices and procedures, which are not equivalent to NERC RS for the reasons set forth in Blue Planet's response to HECO/Blue Planet-IR-1, above.

HECO/Blue Planet-IR-6
Ref: Page 3, second paragraph

⁶ There is no "IR-10, part c."

Please clarify what is meant by the statement “the basic physical and operational characteristics of electric grids in Hawaii and North America are essentially identical”. Specifically, please clarify this statement as it relates to maintaining adequate voltage, balancing supply and demand and maintaining system stability for Hawaii’s islanded grids and the North America market based grids.

RESPONSE:

Please see Response to HECO/Blue Planet-IR-5, above.

HECO/BluePlanet-IR-7

Ref: Page 3, second paragraph

a) Please describe in detail the New Zealand electric grid.

The electricity industry in New Zealand has four main components: generation (electricity production stations), transmission (the high voltage network known as the national grid), distribution (local lines companies), and retail (electricity retail companies which compete to buy wholesale electricity and compete to retail it to consumers).⁷

Transpower, a State-Owned Enterprises (“SOE”), owns and operates the national electricity transmission system, which includes substations, high voltage cables, transformers and overhead lines for transmitting high voltage electricity from generating stations to distribution companies. The grid is an AC transmission system, incorporating a high voltage direct current (“HVDC”) connection from the southern South Island by undersea cable to the southern end of the North Island. Transpower transmits the bulk of New Zealand’s electrical energy throughout the country using high capacity and high voltage transmission lines to regional distribution companies and directly to some large industrial companies.

As the System Operator, Transpower also provides a co-ordination service to schedule the generation of all stations, monitors the interconnected networks, ensures that reliability, voltage and frequency targets are met, and manages grid emergencies. The

⁷ New Zealand Ministry of Economic Development, “Electricity Industry,” *available at* http://www.med.govt.nz/templates/StandardSummary___393.aspx

government Electricity Commission manages a service provider contract with Transpower to ensure effective grid management in real time.⁸ System operator Transpower is responsible for the central role of real-time operation of the electricity system pursuant to formal and transparent reliability standards approved by the Electricity Commission. Transpower further provides monthly reports to the Electricity Commission discussing compliance of system operations with reliability performance requirements.

There are five major generating companies in New Zealand. Generating companies are generally either SOEs or private sector companies. Some smaller generation exists, most of which is associated with major industrial processes (“cogeneration”). Most of New Zealand’s electricity is generated at remote locations and requires an efficient transmission system to transport it to the main demand centers. Around forty sites supply electricity to the national grid. Some of the smaller scale generation is “embedded” and feeds directly into local distribution networks. Approximately 60% of New Zealand's electricity is generated by hydro stations, with the balance from geothermal stations, gas, coal and oil-fired thermal stations, biomass plants and wind farms.⁹

There are twenty eight lines companies that own the local distribution networks throughout New Zealand. The ownership of distribution companies is a mix of public listings, shareholder co-operatives, community trusts and local body ownership, with most lines companies being owned by trusts. Lines companies also differ in size, with one company making up one third of the sector by number of connections, and the largest four companies supplying 66% of all connections. The lines companies are connected to the national grid and

⁸ New Zealand Ministry of Economic Development, “Generation,” *available at* http://www.med.govt.nz/templates/Page_____13488.aspx

⁹ New Zealand Ministry of Economic Development, “Generation,” *available at* http://www.med.govt.nz/templates/Page_____13481.aspx

for the most part sell their services to retailers who provide a bundled delivered electricity service to end consumers, although some distribution companies contract directly with connected consumers. Most consumers are connected to the local networks, but a small number (such as a large aluminum smelter) are directly connected to the national grid.¹⁰

RESPONSE:

b) Please describe in detail the “limited interconnection” between the island grids and how that interconnection may be utilized to balance overall system supply and demand.

RESPONSE:

The New Zealand grid is an AC transmission system, incorporating a HVDC connection from the southern South Island by an HVDC undersea cable to the southern end of the North Island. An HVDC transmission interconnection is not a free-flowing transmission line and does not permit power flows to adjust in real time to balance supply and demand. Thus, supply and demand must be balanced in real time, and in isolation, relying only on island grid resources. In this respect, the New Zealand electric system is comparable to the ERCOT Interconnection and Quebec Interconnection, both of which have only HVDC interconnections and must balance supply and demand in real time, in isolation, relying only on local grid resources.

c) Please describe in detail any differences between the New Zealand reliability standards and the NERC RS governing North America.

RESPONSE:

System frequency reliability standards for North American electrical systems are based on 60 hertz; system frequency reliability standards for New Zealand are based on 50 hertz.

HECO/BluePlanet-IR-8

Ref: Page 5, first partial paragraph.

¹⁰ New Zealand Ministry of Economic Development, “Generation,” *available at* http://www.med.govt.nz/templates/Page_____13497.aspx

Please provide any analyses or studies conducted or commissioned by Blue Planet which indicate that the principles and standards proposed by the Hawaiian Electric Companies in this docket are not designed to preserve system reliability and power quality consistent with the Commission's September 25, 2009 Decision and Order?

RESPONSE:

The HECO Companies' electric systems should be planned and operated according to Hawaii NERC RS as soon as possible. The HECO Companies' electric systems, however, are not currently planned and operated according to Hawaii NERC RS. Blue Planet proposes that future Hawaii NERC-equivalent formal reliability standards be adopted in a manner consistent with the manner in which NERC RS are adopted, i.e., a stakeholder-driven process managed by a neutral standards committee. At this time, there has been no stakeholder-driven process in Hawaii equivalent to the process by which NERC RS are developed. Until this process is undertaken and completed, it is difficult to conclude with confidence whether and to what extent the HECO informal operating practices and procedures are "designed to preserve system reliability and power quality" in compliance with the D&O. *Id.*

HECO/BluePlanet-IR-9

Ref: Page 5, last paragraph.

Please describe in detail how Blue Planet's proposed reliability principles will "establish when additional renewable energy can or cannot be added on an island or region therein without markedly increasing curtailment, either for existing or new renewable projects"?

RESPONSE:

Until Hawaii NERC RS are adopted, Blue Planet's proposed Hawaii Bulk Electric System Reliability Principles can be expected to promote the dramatic acceleration of renewable energy in Hawaii in several important ways. First, because these principles are based on formal principles from NERC, they are expected to be consistent with and supportive of Hawaii NERC RS. Second, they may serve as a timely and appropriate intermediate step toward the adoption of

Hawaii NERC RS. Third, the principles can be expected to clarify and strengthen shared understanding of the basic requirements of the electric systems, thereby further establishing the foundation for Hawaii NERC RS. Finally, these principles can serve as a basis for modification of policies regarding ancillary services and other measures to reduce or eliminate barriers to increased renewable energy on the systems. The Hawaii Bulk Electric System Reliability Principles therefore represents a meaningful step toward Hawaii NERC RS and moving beyond the HECO informal operating practices and procedures.

HECO/Blue Planet-IR-10

Ref: Page 9

Please explain the analytical basis by which the 2.5% limit of the 2008 system peak demand for the first full year of FIT and 5.0% limit for the 2nd year of FIT were derived.

RESPONSE:

For HELCO and MECO, Blue Planet recommends the following. First, for the first full year of the FIT, limit FIT projects for each company to nameplate capacity equal to 2.5% of the 2008 system peak demand ("2.5% FIT cap"). Second, upon completion of the first full year of the FIT, increase the limit on FIT projects for each company to nameplate capacity equal to 5.0% of the 2008 system peak demand ("5.0% FIT cap"). At such time that Commission-approved Hawaii NERC RS become available, a party may seek to raise or lower the 2.5% FIT and/or the 5.0% FIT cap based upon a showing that the cap is inconsistent with the Hawaii NERC RS and an alternative cap would be more consistent with the Hawaii NERC RS.

The proposed 2.5% FIT cap is supported by basic analysis. (Further analysis is subject to obtaining further data and information from the HECO Companies.) Blue Planet's basic analysis is based on several assumptions which apply equally to HELCO and MECO. It is assumed that the majority of FIT projects on the HELCO system would use solar photovoltaic

(“PV”) technology, the solar PV inverters for such projects would have expanded frequency and voltage ride-through capabilities, and that system disturbances would not be exacerbated by the potential “drop-out” of solar PV electrical output due to a decline in system frequency.

Potential instantaneous system frequency fluctuations attributable only to FIT projects would be expected to be within the bounds of normal system frequency control ranges for HELCO and MECO systems as set forth in Table 8, “System Operating Criteria,” of the HECO RS Report. Any assertion that meteorological conditions are capable of producing a substantial instantaneous reduction in electrical output from all solar PV inverters installed across an entire island lacks credibility. Rather, it is reasonable to assume that the 2.5% FIT cap of 5MW would create a maximum instantaneous frequency fluctuation of approximately ± 0.05 Hz ($5 \text{ MW} \times 25\% \text{ potential immediate electrical output drop-off due to cloud cover} \div 2.5 \text{ MW}/0.1\text{Hz frequency bias} = 0.05 \text{ Hz potential frequency fluctuation}$). The maximum potential frequency fluctuations due to solar PV projects would be expected to occur only during the limited hours of peak solar PV electrical output (i.e., 11:00 AM to 2:00 PM). Such a potential maximum frequency fluctuation would require a combined generator ramp rate of less than 2 MW/minute to mitigate potential frequency fluctuations. It is reasonable to assume that HELCO and MECO could each use generator primary frequency response (generator governor droop response) and, if necessary, regulation reserves, to provide this response rate. Thus, potential instantaneous frequency fluctuations from FIT projects are expected to be within the bounds of normal system frequency control ranges for the HELCO and MECO systems.

a) Does the analysis establish that the increase to such levels on HECO, MECO and HELCO will not result in a violation of current system reliability principles/standards in operations today?

RESPONSE:

With regard to the HELCO and MECO systems, the response to HECO/Blue Planet-IR-10, above, establishes that under the 2.5% FIT system cap HELCO and MECO can use generator governor controls and frequency regulation reserves to control potential normal system frequency fluctuations due to FIT projects. With regard to the HECO system, the HECO Companies have concluded that the 5.0% FIT system cap is acceptable. *See, e.g.,* HECO RS Report, Exhibit 1 at 14 (“BEW has established that an initial DG penetration level of 60 MW is deemed feasible[.] . . . “[t]here appears to be adequate space on the HECO distribution system to accommodate FIT and other DG resources additions including from NEM, at least until the FIT Reliability Standards are reviewed within the next year.”).

b) How do these limits project for the long term beyond the 2nd year of the FIT program?

RESPONSE:

The D&O requires review of the FIT program prior to completion of its second year. Accordingly, at this time Blue Planet has not projected any limits beyond the second year of the FIT term.

HECO/BluePlanet-IR-11

Ref: Page 9, second full paragraph.

Please describe in detail how the reliability principles proposed by Blue Planet will “provide greater transparency and predictability with respect to reliability issues for developers”?

RESPONSE:

The three caps issues (i.e., necessity for DG caps, necessity for FIT caps, and necessity of proposed HECO DG and FIT caps) should be evaluated only on the application of Commission-approved Hawaii NERC RS to the relevant facts. HECO informal operating practices and procedures do not provide an adequate basis for these decisions. As discussed above, Hawaii NERC RS are superior to HECO informal operating practices and procedures.

Caps based on Hawaii NERC RS will provide a sound, trustworthy and proper basis a Hawaii FIT cap and therefore contribute to greater transparency and predictability.

HECO/Blue Planet-IR-12

Ref: Page 11

Several recommendations are made to pursue minimizing operations of fossil generation by developing ancillary services products and real time spot pricing mechanisms to provide market signals similar to mainland market connected grids. For small, islanded systems with a limited infrastructure and cost base, please discuss realistic cost and timing associated with pursuing such strategies.

RESPONSE:

Small islanded systems may be relatively more conducive to Blue Planet's suggestions concerning ancillary services and excess energy reduction. For example, New Zealand operates an unbundled market to procure ancillary services essential to grid reliability. Hawaii's relatively small grids and limited number of generators is advantageous concerning reliability analyses and system operations as there are fewer "grid nodes" and no interconnected electric utilities to model.

Hawaii also has an inherent advantage regarding costs. The HECO Companies rely on fossil fuel generators for ancillary services, suggesting ancillary services are more costly in Hawaii than in the continental United States. Hawaii would likely be an attractive market to non-generation ancillary services providers (both in Hawaii and from outside Hawaii), assuming ancillary services prices are unbundled. It is worth noting in this regard that under the Kahuku Wind project power purchase agreement, HECO agreed to pay a separate, unbundled rate for ancillary services from battery energy storage.

RESPONSE TO CONSUMER ADVOCATE'S INFORMATION REQUESTS

CA/BPF-IR-1

Ref: February 8, 2010 Transmittal Filing.

Please explain how Hawaiian Electric Company, Inc., Hawaii Electric Light Company, Inc., and Maui Electric Company, Ltd.'s Capacity Planning Criteria is conceptually different from those reliability standards issued and/or approved by the North American Electric Reliability Corporation.

RESPONSE:

Upon adoption, Hawaii NERC RS would govern planning and operation of the HECO Companies' systems. By contrast, capacity planning criteria apply solely to the HECO Companies' capacity expansion planning. This planning typically occurs as part of the Integrated Resource Planning process. In that respect, the Hawaii NERC RS differ from Hawaii NERC RS.

CA/BPF-IR-2

Ref: February 8, 2010 Transmittal Filing.

Page 2 of Reliability Standards filed by Blue Planet Foundation ("Blue Planet") on February 8, 2010 states in part that: Once approved by the U.S. Federal Energy Regulatory Commission ("FERC"), NERC RS become legally binding on all owners, operators and users of the bulk power system. NERC has the legal authority to enforce compliance with NERC RS, which it achieves in part through the imposition of financial penalties. As Blue Planet is recommending the establishment of reliability standards in Hawaii similar to the NERC standards, please discuss whether Blue Planet is recommending that such standards be applicable to all owners and operators of generation connecting to the HECO Utilities' electric system. If not, please explain why.

RESPONSE:

The Hawaii NERC RS should generally apply to all generators supplying power to the HECO Companies. As part of the Hawaii NERC development process, stakeholders may determine that it is appropriate to limit or exempt certain aspects of the standards (e.g., financial penalties) from application to certain types or classes of generators (e.g., Tier 1 FIT projects).

CA/BPF-IR-3

Ref: February 8, 2010 Transmittal Filing.

Page 9 of Blue Planet's Reliability Standards states in part that: Given the HECO program cap of nameplate capacity equal to five percent of 2008 system peak demand, system reliability issues for HECO during the initial two-year FIT appear unlikely. Please provide

the analysis conducted by Blue Planet in its determination that its recommended system cap on HECO's nameplate capacity of its existing generating units would not result in system reliability issues during the initial two-year FIT.

RESPONSE:

The HECO Companies have concluded that the 5.0% FIT system cap is acceptable. *See, e.g.*, HECO RS Report, Exhibit 1 at 14 (“BEW has established that an initial DG penetration level of 60 MW is deemed feasible[.] . . . “[t]here appears to be adequate space on the HECO distribution system to accommodate FIT and other DG resources additions including from NEM, at least until the FIT Reliability Standards are reviewed within the next year.”). At this time, Blue Planet has conducted no further access based on additional data or information provided by the HECO Companies’ concerning the foregoing conclusion by the HECO Companies.

CA/BPF-IR-4

Ref: February 8, 2010 Transmittal Filing.

Page 11 of Blue Planet's Reliability Standards recommends the implementation of flywheel storage technology. Please provide copies of any documentation that Blue Planet has on projects implemented using the flywheel storage technology.

RESPONSE:

It is Blue Planet’s understanding is that at this time the Independent System Operator in New England utilizes flywheel storage technology to provide frequency regulation reserve and the New York ISO is expected to begin doing so shortly. Mainland ISOs have revised their technical specifications for frequency regulation reserves to accommodate stored energy resources (“SERs”), such as flywheel storage technology. Flywheel and battery storage

technologies can provide frequency regulation at faster response rates and with reduced fossil fuel consumption and greenhouse gas emissions compared to conventional generation resources.

DATED: Honolulu, Hawaii, March 1, 2010.



DOUGLAS A. CODIGA
Attorney for Blue Planet Foundation

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE
STATE OF HAWAII

In the Matter of

PUBLIC UTILITIES COMMISSION

Instituting a Proceeding to Investigate the
Implementation Of Feed-in Tariffs.

DOCKET NO. 2008-0273

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that on this date a copy of the foregoing document was
duly served upon the following individuals by placing a copy of same in the United States Mail,
postage prepaid, and/or by electronic service, as follows:

DEAN NISHINA
EXECUTIVE DIRECTOR
DEPT. OF COMMERCE & CONSUMER AFFAIRS
DIVISION OF CONSUMER ADVOCACY
P.O. Box 541
Honolulu, HI 96809

2 copies by U.S. Mail and
Electronic Service

DEAN MATSUURA
MANAGER
REGULATORY AFFAIRS
HAWAIIAN ELECTRIC COMPANY, INC.
P.O. Box 2750
Honolulu, HI 96840-0001

Electronic Service

JAY IGNACIO
PRESIDENT
HAWAII ELECTRIC LIGHT COMPANY, INC.
P. O. Box 1027
Hilo, HI 96721-1027

Electronic Service

EDWARD L. REINHARDT
PRESIDENT
MAUL ELECTRIC COMPANY, LTD.
P. O. Box 398
Kahului, HI 96732

Electronic Service

THOMAS W. WILLIAMS, JR., ESQ.
PETER Y. KIKUTA, ESQ.
DAMON L. SCHMIDT, ESQ.
GOODSILL, ANDERSON QUINN & STIFEL
Alii Place, Suite 1800
1099 Alakea Street
Honolulu, HI 96813

Electronic Service

Counsel for Hawaiian Electric Company, Inc.
Hawaii Electric Light Company, Inc.
Maui Electric Company, Ltd.

ROD S. AOKI, ESQ.
ALCANTAR & KAHL LLP
120 Montgomery Street, Suite 2200
San Francisco, CA 94104

Electronic Service

Counsel for Hawaiian Electric Company, Inc.
Hawaii Electric Light Company, Inc.
Maui Electric Company, Ltd.

THEODORE PECK
DEPARTMENT OF BUSINESS, ECONOMIC
DEVELOPMENT, AND TOURISM
State Office Tower
235 South Beretania Street, Room 501
Honolulu, HI 96813

Electronic Service

ESTRELLA SEESE
DEPARTMENT OF BUSINESS, ECONOMIC
DEVELOPMENT, AND TOURISM
State Office Tower
235 South Beretania Street, Room 501
Honolulu, HI 96813

Electronic Service

MARK J. BENNETT, ESQ.
DEBORAH DAY EMERSON, ESQ.
GREGG J. KINKLEY, ESQ.
DEPARTMENT OF THE ATTORNEY GENERAL
425 Queen Street
Honolulu, HI 96813

Electronic Service

Counsel For Department of Business, Economic
Development, and Tourism

CARRIE K.S. OKINAGA, ESQ.
GORDON D. NELSON, ESQ.
DEPT. OF THE CORPORATION COUNSEL
CITY AND COUNTY OF HONOLULU
530 South King Street, Room 110
Honolulu, HI 96813

Electronic Service

Counsel for City and County of Honolulu

LINCOLN S.T. ASHIDA, ESQ.
WILLIAM V. BRILHANTE JR., ESQ.
MICHAEL J. UDOVIC, ESQ.
DEPT. OF THE CORPORATION COUNSEL
COUNTY OF HAWAII
101 Aupuni Street, Suite 325
Hilo, HI 96720

Electronic Service

Counsel for County of Hawaii

MR. HENRY Q CURTIS
MS. KAT BRADY
LIFE OF THE LAND
76 North King Street, Suite 203
Honolulu, HI 96817

Electronic Service

MR. CARL FREEDMAN
HAIKU DESIGN & ANALYSIS
4234 Hana Highway
Haiku, HI 96708

Electronic Service

MR. WARREN S. BOLLMEIER II
PRESIDENT
HAWAII RENEWABLE ENERGY ALLIANCE
46-040 Konane Place, #3816
Kaneohe, HI 96744

Electronic Service

MR. MARK DUDA
PRESIDENT
HAWAII SOLAR ENERGY ASSOCIATION
P.O. Box 37070
Honolulu, HI 96837

Electronic Service

MR. RILEY SAITO
THE SOLAR ALLIANCE
73-1294 Awakea Street
Kailua-Kona, HI 96740

Electronic Service

MR. JOEL K. MATSUNAGA
HAWAII BIOENERGY, LLC
737 Bishop Street, Suite 1860
Pacific Guardian Center, Mauka Tower
Honolulu, HI 96813

Electronic Service

KENT D. MORIHARA, ESQ.
KRIS N. NAKAGAWA, ESQ.
SANDRA L. WILHIDE, ESQ.
MORIHARA LAU & FONG LLP
841 Bishop Street, Suite 400
Honolulu, HI 96813

Electronic Service

Counsel for Hawaii Bioenergy, LLC

MR. THEODORE E. ROBERTS
SEMPRA GENERATION
101 Ash Street, Hq. 12
San Diego, CA 92101

Electronic Service

MR. CLIFFORD SMITH
MAUI LAND & PINEAPPLE COMPANY, INC.
P.O. Box 187
Kahului, HI 96733

Electronic Service

KENT D. MORIHARA, ESQ.
KRIS N. NAKAGAWA, ESQ.
SANDRA L. WILHIDE, ESQ.
MORIHARA LAU & FONG LLP
841 Bishop Street, Suite 400
Honolulu, HI 96813

Electronic Service

Counsel for Maui Land & Pineapple Company, Inc.

MR. ERIK KVAM
CHIEF EXECUTIVE OFFICER
ZERO EMISSIONS LEASING LLC
2800 Woodlawn Drive, Suite 131
Honolulu, HI 96822

Electronic Service

PAMELA JOE, ESQ.
SOPOGY INC.
2660 Waiwai Loop
Honolulu, HI 96819

Electronic Service

GERALD A. SUMIDA, ESQ.
TIM LUI-KWAN, ESQ.
NATHAN C. NELSON, ESQ.
CARLSMITH BALL LLP
ASB Tower, Suite 2200
1001 Bishop Street
Honolulu, HI 96813

Electronic Service

Counsel for Hawaii Holdings, LLC, dba First Wind
Hawaii

MR. CHRIS MENTZEL
CHIEF EXECUTIVE OFFICER
CLEAN ENERGY MAUI LLC
619 Kupulau Drive
Kihei, HI 96753

Electronic Service

HARLAN Y. KIMURA, ESQ.
Central Pacific Plaza
220 South King Street, Suite 1660
Honolulu, HI 96813

Electronic Service

Counsel for Tawhiri Power LLC

SANDRA-ANN Y.H. WONG, ESQ.
Attorney At Law, A Law Corporation
1050 Bishop Street, #514
Honolulu, HI 96813

Electronic Service

Counsel for Alexander & Baldwin, Inc., through its
division, Hawaiian Commercial & Sugar Company

DATED: Honolulu, Hawaii, March 1, 2010.



DOUGLAS A. CODIGA
Attorney for Blue Planet Foundation